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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/760,741 | 01/17/2001 | Jerry M. Brooks | M4065.0374/P374 | 5786 |

24998 7590 04/03/2003

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EXAMINER

CHU, CHRIS C

ART UNIT PAPER NUMBER

2815

DATE MAILED: 04/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/760,741

Applicant(s)

BROOKS, JERRY M.

Examiner

Chris C. Chu

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 January 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 4 - 21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 4 - 21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 February 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The amendment filed on January 27, 2003 has been received and entered the case.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

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3. Claims 1, 4 ~ 7 and 10 ~ 12 are rejected under 35 U.S.C. 102(e) as being anticipated by King et al.

Regarding claim 1, King et al. discloses in Fig. 1, Fig. 3, column 3, lines 52 ~ 53 and column 3, lines 65 ~ 67 a semiconductor assembly comprising:

- a support structure (18) having a top surface, wherein said support structure is a film;
and
- at least one semiconductor die (14D) having a top and bottom surface, said bottom surface having a smaller area than said top surface of said support structure, said at least one semiconductor die (14D) being secured at its bottom surface to said top surface of said support structure by a flowable adhesive material (22D) which does not extend past a perimeter of said at least one semiconductor die.

Regarding claim 4, King et al. discloses in Fig. 1 said support structure being at least one semiconductor die with a top and bottom surface.

Regarding claim 5, since King et al. does not limit an adhesive to be any specific or particular material, hence his/her disclosure encompasses all well known adhesive material's including "epoxy."

Regarding claim 6, King et al. discloses in Fig. 3 and column 3, lines 65 ~ 67 said flowable adhesive material (22D) covering an area less than or equal to about 90% of said at least one semiconductor die bottom surface area.

Regarding claim 7, King et al. discloses in Fig. 3 and column 3, lines 65 ~ 67 said flowable adhesive material covering an area greater than or equal to about 50% of said at least one semiconductor die bottom surface area.

Regarding claim 10, King et al. discloses in Fig. 3 said at least one semiconductor die being in electrical communication (42) with at least one electrical contact area (36 and 38) provided on said support structure.

Regarding claim 11, King et al. discloses in column 4, lines 48 ~ 67 said electrical communication being through a wire bond (50).

Regarding claim 12, King et al. discloses in Fig. 3 said at least one electrical contact area being a bonding pad (30D).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over King et al. in view of Ball.

Regarding claims 8 and 9, King et al. discloses the claimed invention except for a distance between an electrical contact area and said perimeter of said at least one semiconductor die is less than or equal to about 200 microns. However, Ball teaches in Fig. 2 a distance between an electrical contact area and a perimeter of at least one semiconductor die being less

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than or equal to about 200 microns. Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify King et al. by using the distance being less than or equal to about 200 microns as taught by Ball. The ordinary artisan would have been motivated to modify King et al. in the manner described above for at least the purpose of decreasing a size of the package.

6. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over King et al. in view of Fukui et al.

Regarding claim 13, King et al. discloses the claimed invention except for encapsulating material for encapsulating said die, electrical communication, and at least a portion of said support structure. However, Fukui et al. teaches in Fig. 1 encapsulating material (8) for encapsulating a die, an electrical communication, and at least a portion of a support structure. Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify King et al. by using the encapsulating material as taught by Fukui et al. The ordinary artisan would have been motivated to modify King et al. in the manner described above for at least the purpose of protecting semiconductor devices.

Regarding claim 14, Fukui et al. discloses in Fig. 11(f) said encapsulating material fills (8) in at least some portion of a space between said bottom surface of said die and said top surface of said support structure.

7. Claims 15 ~ 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over King et al. in view of Lo et al.

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Regarding claim 15, King et al. discloses in Fig. 1 and column 3, lines 65 ~ 67 a semiconductor assembly comprising:

- a first semiconductor die (14D) having a top and a bottom surface;
- a second semiconductor die (14C) having a top and bottom surface, said second die being secured at its bottom surface to said surface of said first semiconductor die by a flowable adhesive material (22C) which does not extend past a perimeter of said second semiconductor die.

King et al. does not disclose said bottom surface of a second semiconductor chip having a smaller area than said top surface of said first semiconductor die; wherein said top surface of said first semiconductor die has at least one electrical contact area positioned at a location exterior to said perimeter of said second semiconductor die; and wherein a distance between said electrical contact area and said perimeter of said second semiconductor die being less than or equal to about 428 microns. However, Lo et al. discloses in Fig. 1 and column 2, lines 31 ~ 58 a bottom surface of a second semiconductor chip (11) having a smaller area than a top surface of a first semiconductor die (12); a top surface of a first semiconductor die (12) having at least one electrical contact area (13) positioned at a location exterior to a perimeter of a second semiconductor die (11); and wherein a distance (A) between said electrical contact area and the perimeter of the second semiconductor die is less than or equal to about 428 microns. Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify King et al. by using the bottom surface of a second semiconductor chip and the distance and location of the electrical contact area as taught by Lo et al. The ordinary artisan would have been motivated to modify King et al. in the manner described above for at least the

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purpose of preventing a capillary from colliding with the chip during the three-dimensional package wiring process (column 1, lines 62 ~ 64).

Regarding claim 16, King et al. discloses in Fig. 1 said first semiconductor die (14D) being secured to a support structure (18).

Regarding claim 17, King et al. discloses in Fig. 1 and column 3, lines 52 and 53 said support structure (18) being a film.

Regarding claims 18, King et al. discloses in column 3, lines 52 and 53 said support structure being a printed circuit board.

Regarding claim 19, since King et al. does not limit an adhesive to be any specific or particular material, hence his/her disclosure encompasses all well known adhesive material's including "epoxy."

Regarding claim 20, King et al. discloses in Fig. 3 and column 3, lines 65 ~ 67 said flowable adhesive material (22D) covering an area less than or equal to about 90% of said at least one semiconductor die bottom surface area.

Regarding claim 21, King et al. discloses in Fig. 3 and column 3, lines 65 ~ 67 said flowable adhesive material covering an area greater than or equal to about 50% of said at least one semiconductor die bottom surface area.

Response to Arguments

8. Applicant's arguments filed on January 27, 2003 have been fully considered but they are not persuasive.

Applicant argues “King et al. does not teach or suggest that the ‘flowable adhesive material ... does not extend past a perimeter of said at least one semiconductor die’ as recited in claim 1.” This argument is not persuasive. King et al. clearly shows in Figs. 1, 3 and 13A flowable adhesive material (22D) ... does not extend past a perimeter of said at least one semiconductor die (14D).

For the above reason the rejection is maintained.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chris C. Chu whose telephone number is (703) 305-6194. The examiner can normally be reached on M-F (10:30 - 7:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7382 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Chris C. Chu
Examiner
Art Unit 2815

C.C.
March 31, 2003



EDDIE LEE
SUPERVISORY PATENT EXAMINER
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